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Process and Product Systems Presentation

Charles Anthony Mitchell
Technological University Dublin, charles.mitchell@tudublin.ie

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Process and Product Systems
“Iconic” Construction Project

Aviva Stadium, Dublin, Ireland

Submitted by: Charles Mitchell
Student ID Number: @00330617

"ICONIC"

- "very famous and well known, and believed to represent a particular idea"

www.mcmillandictionary.com/dictionary/british/iconic

Overview of the project – Aviva Stadium, Dublin, Ireland

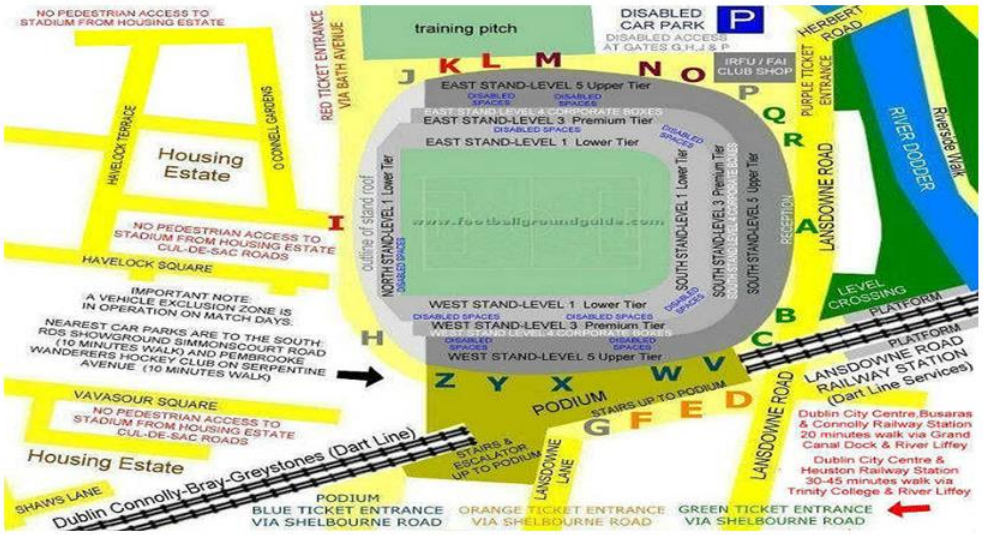
- Built on the site of the world's oldest international rugby ground.
- 51,700 seats in a continuous curvilinear shaped stand enclosing all four sides of the ground.
- Design developed to provide maximum daylight to the pitch whilst maintaining daylight to the neighbouring residential area.
- Cost €410million
- Construction Period May 2007 until April 2010.
- Site size 63,802 sq.m
- Project included the demolition and recycling of the existing stadium, 5,000 tonnes of structural steel, 8,000 precast concrete units manufactured off site, 72,000 tonnes concrete cast in-situ on site.

Awards

- Awarded British Construction Industry Award (BCIA) for best International Project 2011.
- Awarded RIBA (Royal Institute of British Architects) Award – projects in the European Union region 2011.
- Winner Irish Concrete Society Awards – Building Category and Overall Winner 2010

Background

- Located in the heart of Dublin city adjacent to a busy rail way line, housing and the river Dodder.
- Part of the demolition of the existing West stand was over the railway and facilitated the construction of a new podium structure which gave access to higher levels within the proposed structure.
- A venue for sports events, concerts and conferences.
- Main national IRFU (Rugby) and FAI (Soccer) match venue
- The client, Lansdowne Road Stadium Development Company (LRSDC), engaged consultants for all stages from concept stage.
- Consultants hired based on experience of similar projects.
- Extensive public consultation exercise prior to submitting planning application.
- LRSDC appointed sub-contractors, prior to receipt of planning, for many of the larger packages. The main contractor, Sisk, would later take these on as domestic contractors.
- Main Contractor, Sisk, had previously worked on the redevelopment of Croke Park. But this was really 4 projects over a 12 year period.

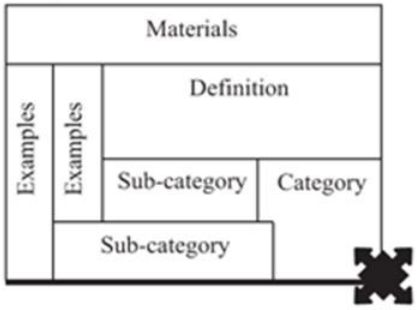


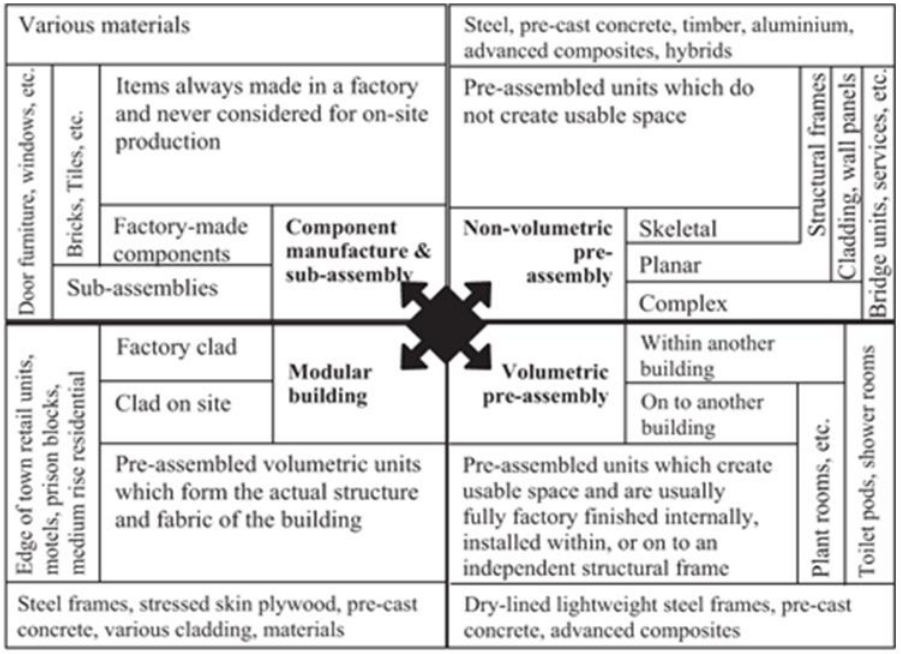
Aviva Stadium, Dublin, Layout plan.

The Approach - Off-site Manufacture

Main off-site manufacture sub-contract packages – Mainly Non-volumetric pre-assembly:

- Pre-cast concrete frame and floors.
- Precast concrete tunnels.
- Precast concrete culverts.
- Poly-carbonate roofing and cladding.
- Roof steelwork.





Source: Gibb and Isack (2003)

Off-site Manufacture – The Relevance

- The site was very restricted as nearly the entire footprint of the site was built upon. This reduced the space available to store plant and materials during construction.
- Access routes were limited and congested.
- Public transport routes, namely rail, could not be effected for long periods of time.
- On-site manufacture would have posed a greater threat of environmental danger to the local water table and waterways.
- Off-site manufacture cited as a key element in the success of the timely delivery of the project.
- Off-site manufacture combined with just in time delivery reduced the material storage requirements on site.
- Programme was key. This is shown by the way in which the Client and design team commenced at concept stage. Planning was paramount.
- In order to set the pace and keep momentum, design needed to incorporate a manufacturing strategy. In this case off-site manufacture combined with just in time delivery.
- Both Client and design team noted the relevance of the earlier design in specialist subcontractor packages requiring off-site manufacture

Off-site Manufacture – The Reality

- This redevelopment project had been in discussion for many years and once approved it needed to proceed quickly and efficiently as there were limited options regarding alternative venues.
- The Client (LDRDC) compiled a design and construction management collaborative team together in order to design a mechanism which would allow efficient construction.
- Strategic sub-contractors were engaged at pre-planning stage and then appointed as domestic sub-contractors to the main contractor (SISK) after selection.
- All risk factors were reviewed (such as cost, time, available space, treat of legal proceedings, but to name a few) and it was decided that the construction process needed to be streamlined.
- The collaborative team designed the building using systems which satisfied the structural integrity, usability and aesthetic requirements of the Client.
- These systems also allowed for components to be manufactured off-site and delivered when necessary. This practice aligns itself to the work of Azimi, Lee and AbouRizk, (2011) who noted the advantages of off-site construction as *"higher productivity, better quality, better safety, and improved time and cost effectiveness"*.
- These components were used in all parts of the construction (examples include: precast culverts, 3,500tonne precast structure over the railway line for 150m, pre-cast flooring, steel frame, roof steel, poly-carbonate cladding etc.)
- **Construction** and **manufacturing process** planning is a crucial and challenging management task. A good plan is essential to project success (Zozaya-Gorostiza, 2013)

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